1. The true larval head has been invaginated to form a prepharyngeal part of the larval alimentary canal. The functional part of the larval head is a mere remnant of the original head.

2. The buds of the imaginal head are carried into the thoracic cavity by the involution of the larval head.

3. The cephalopharyngeal skeleton of the larva is a chitinization in the true larval pharynx, in the walls of the invaginated head, and in the pouches of the latter.

4. The mouth hooks of the larva are located in a part of the invaginated larval head which was either the back part of the original head, or the neck. They appear to be special cuticular larval organs moved by special muscles. No evidence of their mandibular nature has yet been produced.

5. The dorsal spiracles of the larva and pupa are special breathing organs secondarily developed in connection with the dorsal longitudinal trunks of the tracheal system. The spiracles of the adult first appear on the puparium, and are developed in connection with the lower tracheal trunks. The two sets of spiracles are entirely independent of each other.

The larva molts inside the puparium, casting a fourth skin which remains as an envelope about the pupa, unbroken until the fly emerges. The fly leaves both the pupal skin and the prepupal or fourth larval skin inside the puparium.

7. The pupa obtains air through the larval tracheal trunks attached to the anterior larval spiracles of the puparium, these trunks being ruptured inside the fourth larval skin a short distance back of the spiracles.

8. The imaginal buds of appendages belong in all cases to the pupal stage. They may secondarily begin their development in early larval stages or in the embryo, but only in cases where the external larval appendage is entirely gone.

Second paper: CARL HEINRICH, *A revision of the North American moths of the subfamily Eucosminae of the family Olethreutidae*. Pierce's paper opens a new system of classification. In this genitalia take the place of the old wing venation type of classification. In time all species will be described from the male genitalia.

Notes: A. N. CAUDELL spoke of the collection of *Grylloblatta campodeiformis* Walker in California by H. S. Barber.

Dr. SCHWARZ exhibited two specimens of *Mylabris cichorii* L. and said this is a beneficial species, being used for medicinal purposes. This species is often eaten when the Chinese want to commit suicide.

Dr. ALDRICH exhibited a photograph of a group of Dipterists taken in Boston at the recent meeting in December 1922.

J. C. BRIDWELL presented the following three notes:

1. *The habits of* Bruchus bixae.

In 1820 Drapiez described a species of *Bruchus* from Brazil which he believed bred in the seeds of annatto and called it *Bruchus bixae* from the generic name of the host plant, *Bixa orellana*. Since many old specific names of Brucidae based on plant names were in error and this record of a *Bruchus* in this plant so far removed from the legumes in its natural relationships and in the nature of the seeds and pods has never been confirmed, it has been a matter of interest to find what seems to be this species bred from this host plant collected by Dr. Schwarz in Panama. In this material was a considerable lot of the capsules and seeds of Bixa infested by *Bruchus bixae*. The adult Bruchids slip in between the partly opened valves of the pod to oviposit upon the seeds in a sheltered position much as its allies *B. pruininus* and

B. limbatus oviposit in the partly opened pods of *Leucaena, Pithecollobium* and various species of *Acacia*. No eggs were seen deposited upon the pods.

The seeds are irregularly pyramidal broadest and flattened at the summit, about 4 mm. broad and 5 mm. long with a peculiar scar-like structure at the summit. The rest of the surface of the seed is covered with small masses of a soft, reddish-orange waxy substance from which the annatto of commerce is derived, the source of most commercial cheese and buttercolor and of some inferior varnish stains and dyes for silk. The eggs are deposited singly upon the seed and a single Bruchus is nourished by a seed. The cotyledons are broad and foliaceous disposed between thick masses of soft brittle albumen which is largely consumed by the larva during its development as in the case of the Bruchidae attacking the seeds of *Hibiscus, Ipomoea* and *Convolvulus*.

The eggs are nearly hemispherical, but little flattened by the copious cement substance and show but little reticulation on the surface. The larvae as usual bore directly into the seed when emerging from the egg.

The present species may be expected to continue breeding indefinitely in the annatto seeds as long as they are kept at a temperature high enough, but little injury is done to the seeds so far as the coloring matter is concerned. Their presence, however, is undesirable and they would be likely to destroy seed designed for planting. The maceration of the seed in boiling water in extracting the color would doubtless destroy the insects contained in the seed.

2. *Retarded development in* Eurytoma rhois.

What was believed to be this species was found very commonly by Miss Marion Van Horn in the seeds of *Rhus glabra* and *R. typhina* during the winter of 1921–22 in the vicinity of Washington. The material collected in January had the larvae full-fed and in a very thin membraneous coccoon lining the seed cavity. The material was brought into the laboratory of the Division of Stored Product Insects and held for breeding out. Few adults emerged, but on the examination of the seeds in February 1923 a considerable part of them had transformed and died without emerging probably owing to the excessive heat and dryness of the laboratory. There were also in the seeds a considerable number of living full-fed larvae. There is then in this species of phytophagous chalcid a phenomenon of retarded development such as has been recorded for the clover seed chalcid and some of the Opiine Braconidae. It is likely that most of the seed chalcids will be found to have the same ability to remain dormant in the full-fed larva for extended periods under adverse conditions of drought or subnormal temperatures and this will need to be guarded against in the control and quarantine of such insects. This phenomenon is doubtless far more common than has been recorded for it is questionable if insects in regions with a variable winter climate or those arid regions where effective rainfall may be absent for a year or more could survive if compelled to depend upon steady straightforward development in conformity with the calendar.

The seeds of *Ceanothus americanus* are infested in this vicinity by a seed chalcid not yet bred. As in other cases the seeds often show no external sign of infestation. The larva completely destroys the seed leaving only the coverings.

3. *Pupae of the walnut hull maggot living two years* (Rhagoletis suavis Loew).

During the fall of 1920 the writer secured many walnut hull maggots in and near Glen Echo, Maryland. The puparia from these were brought into the laboratory of the Division of Stored Product Insect investigations. Emergence of 23 adults was noted on March 8, 1921. From that time until June 21 scattering emergence continued, usually not more than one